S-101PT Order of Records in S-101

Holger Bothien and Frank Hippmann, Nov. 2022

SevenCs Software

Motivation

Why is the order of ISO 8211 records important?

- To ensure referential integrity of the data that is imported into the ECDIS or Chart Display System. I.e., we want to avoid referencing records that don't exist.
- Allows OEMs to develop single pass parses for S-101 datasets.
  - Simpler code, less error prone, more efficient.

Background

- The logic for the ordering of ISO 8211 records for S-101 (Annex B B.1) is based upon the S-57 ENC Product Specification (6.1.1).
- Some of the problems are inherited.

Sub-ordering of Feature Records

- Specific sub-ordering of feature type records is not required, as long as the general rule (defined on the next slide) is followed. E.g., there is no need to specify meta features before geographic features.

General Rule

The order of records must ensure that every record that is referenced must be defined beforehand.

By beforehand, we mean records that have been defined earlier within the same file, or within earlier updates or base dataset.

General Rule

- We require this general rule, because the following record types may references records of the same type.
  - Information Type records
  - Composite Curve records
  - Feature Type records

Deletion of Records

- The S-57/S-101 ordering of records doesn't take into account the deletion of records.
- The order for delete should be the **reverse** of the order for insert.
- For example
  - Insert: Surface -> Feature
  - Delete: Feature -> Surface
- This is to ensure that records aren't deleted that are still being referenced by *parent* records.

Proposed Order of Records

1. Dataset General Information record
2. Dataset Coordinate Reference System record
3. Information Type records (RUIN=Insert) ordered from child to parent
4. Point records (RUIN=Insert)
5. Multi Point records (RUIN=Insert)
6. Curve records (RUIN=Insert)
7. Composite Curve records (RUIN=Insert) ordered from child to parent
8. Surface records (RUIN=Insert)
9. Feature Type records (RUIN=Insert) ordered from child to parent
10. Information Type records (RUIN=Modify)
11. Point records (RUIN= Modify)
12. Multi Point records (RUIN= Modify)
13. Curve records (RUIN= Modify)
14. Composite Curve records (RUIN= Modify)
15. Surface records (RUIN= Modify)
16. Feature Type records (RUIN= Modify)
17. Feature Type records (RUIN=Delete) ordered from parent to child
18. Surface records (RUIN=Delete)
19. Composite Curve records (RUIN=Delete) ordered from parent to child
20. Curve records (RUIN=Delete)
21. Multi Point records (RUIN=Delete)
22. Point records (RUIN=Delete)
23. Information Type records (RUIN=Delete) ordered from parent to child

Update to S-101 Text

The sentence (B.1 B1):

This order of records will enable the import software to check that the child record exists each time the parent record references it (that is, it will already have read the child record so it will know if it exists or not).

should have the following text added:

It will furthermore guarantee that all records that are going to be deleted are not referenced by any other record.

Update to S-101 Text

Remove the following sentence from (B.1 B2):

The order of records in the files must be the same as that described in these tree structure diagrams.

The tree structure diagrams does not define the order, but the **hierarchy** of records, fields, and sub-fields.

Update to S-101 Text

```
|--<0..*>--Information record
|    |
|    |--<1>-IRID (5): Information Type Record Identifier field
|       |
|       |--<0..*>- ATTR (*5): Attribute field
|       |
|       |--<0..*>- INAS (5\\*5): Information Association field
|
|
|--<0..*>-- Point record
|    |
|    |--<1>-PRID (4): Point Record Identifier field
|       |
|       |-<0..*>-INAS (5\\*5): Information Association field
|       |
|       | alternate coordinate representations
|       |
|       *-<1>-C2IT (2): 2-D Integer Coordinate Tuple field
|       |
|       *-<1>-C3IT (4): 3-D Integer Coordinate Tuple field
|
|
|--<0..*>-- Multi Point record
|    |
|    |--<1>-MRID (4): Multi Point Record Identifier field
|       |
```

Actions Required by S-101PT

The S-101PT is invited to:

1. note this paper
2. discuss this paper
3. endorse the proposals and make the appropriate changes

Note: A separate proposal regarding the general order of records has been submitted to S-100 WG.

Thank you!

SevenCs Software